A NEW SPECIES OF *CAPITONIUS* (HYMENOPTERA: BRACONIDAE) FROM COSTA RICA WITH REARING RECORDS

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Abstract.—Capitonius tricolorvalvus, NEW SPECIES is described from Costa Rica. The species was reared from a stem gall of Cissus verticillata (L.) Nicholson & C. E. Jarvis and from leaf petioles of Cecropia spp.

Key Words.-Insecta, Braconidae, Cenocoeliini, Capitonius, Costa Rica, rearing records.

In the past 10 years much effort has been made to sample the insect fauna in Costa Rica. At least 30 Malaise traps have been operating throughout Costa Rica to collect specimens used to develop the book "The Hymenoptera of Costa Rica" (Hanson & Gauld 1995). At the same time, INBio (Instituto National de Biodiversidad; see Janzen 1991, Gámez & Gauld 1993) started sampling insects by hand collecting, Malaise traps, light traps and other trapping devices. As a result, hundreds of specimens of Cenocoeliini were collected, of which most belong to undescribed species (van der Ent & Shaw 1998). Most Cenocoeliini were collected by Malaise traps and, therefore, host records are lacking. In temperate regions, Cenocoeliini parasitize wood-boring and bark-boring beetle larvae, mostly belonging to the families Cerambycidae and (less commonly) Scolytidae and Buprestidae (Saffer 1982). The only published host record for Cenocoeliini in Costa Rica is that of *Capitonius andirae* (Saffer), NEW COMBINATION, parasitizing seed-infesting curculionid beetle larvae (Saffer 1977). Recently an undescribed species of Cenocoeliini has been reared from a cerambycid larva which lived in an epiphytic species of Solanaceae (Quesada, INBio, unpublished data). The species described below is commonly encountered in Costa Rica and was reared from a stem gall and from leaf petioles. These are the first records of a species of Cenocoeliini from these types of plant substrates. It supports the expectation (van der Ent & Shaw 1998) that neotropical Cenocoeliini will display a wider variety of host habitat adaptations than their counterparts in temperate regions.

Capitonius can be identified as member of the tribe Cenocoeliini or subfamily Cenocoeliinae using the keys of van Achterberg (1993), Sharkey (1997) or Shaw (1995). The tribe Cenocoeliini is a monophyletic group which traditionally has been placed within the subfamily Helconinae, but more recently was considered to form the main tribe in a separate subfamily Cenocoeliinae (Achterberg 1994). Cenocoeliini are easily recognizable by the high insertion of the metasoma on the propodeum, a unique character among the non-cyclostome Braconidae. Van Achterberg provided generic keys to the world Cenocoeliinae (1994) and to the New World Cenocoeliinae (1997). The morphological terminology mostly follows that used by Sharkey and Wharton (1997) with some additional characters defined by van Achterberg (1994, 1997). Authorship of this new species is attributed to the senior author (LJE).



Figure 1. Lateral habitus of Capitonius tricolorvalvus.

CAPITONIUS TRICOLORVALVUS ENT, NEW SPECIES (Figs. 1–10)

Types.—Holotype, female: COSTA RICA, HEREDIA: 3 km S of Puerto Viejo, OTS, La Selva, 100 m el, Dec 1992, P. Hanson, Malaise trap; deposited: Insect Museum, University of Wyoming, Laramie, U.S.A. Paratypes: 29 same data as holoype; 29 same data except Sep 1992; 19 same data except Oct 1992; 19 same data except Nov 1992; 29 same data except Jan–Feb 1993; 69 same data except Feb-Mar 1993; 3[°] same data except Feb-Apr 1993, huertos plots; ALA-JUELA, 29 Est. Biol. San Ramón, 900 m el, Jul-Aug 1995; 23 same data except Jul-Aug 1998 (reared); GUANACASTE, 19 N. P. Guanacaste, Est. Pitilla, 9 km S of Santa Cecilia, 700 m el, Sep 1993; 13 same data except Jun 1994; LIMÓN, 19 4 km NE of Bribri, 50 m el, Sep-Nov 1989; 19 same data except Dec 1989-Mar 1990; 1^o same data except Apr–Jun 1990; 1^o same data except Jul–Sep 1990; 19 16 km W of Guapiles, 400 m el, Jul-Sep 1990; 18 sector Cocori, 30 km N de Cariari, Finca E. Rojas, 100 m el, Mar 1994, 19 same data except 15 Dec 1994 (hand collected); 13, 19 Teleférico (Aerial Tram), 500 m el, May 1997 (reared); PUNTARENAS, 2º R. F. Golfo Dulce, 3 km SW of Rincón, 10 m el, Oct–Dec 1990; 29 same data except Mar–May 1991; 19 same data except Aug



Figure 2. Capitonius tricolorvalvus. Hind wing.



Figure 3–4. Head of *Capitonius tricolorvalvus*. Figure 3. Frontal cavity. Postero-dorsal view. Figure 4. Lower face and clypeus. Anterior view.

1991; 1 \degree same data except Sep 1991; 1 \degree same data except Apr 1993; 1 \degree Cerro de Oro, Rio Rincón, 100 m el, 1–15 May 1995; 1 \degree R. F. Golfo Dulce, 24 km W of Piedras Blancas, 200 m el, Dec 1989–Mar 1990; 1 \degree same data except Nov 1991; 1 \degree same data except June–Aug 1991; 1 \degree R. F. Golfo Dulce, 5 km W of Piedras Blancas, 100 m el, Aug–Sep 1991; 2 \degree Peninsula Osa, Rancho Quernado, Rio Riyitio, 200 m el, Sep–Oct 1992; 1 \degree Peninsula Osa, 8 km S Rio Rincon Coopemarti, 30 m el, Feb 1991; 1 \degree P. N. Corcovado, Est. Sirena, 50 m el, Apr–Aug 1989; 1 \degree same except Mar–Jun 1991; 1 \degree San Vito de Coto Brus, Las Cruces, 1200 m el, 9 Jul–7 Aug 1982; 1 \degree SAN JOSE, Res. Biol. Carara, Est. Bijagual, 500 m el, Jan 1990. Paratypes are deposited at the location of the holotype, at the Museum de Insectos, Universidad de Costa Rica, Ciudad Universitaria, San Pedro de Montes de Oca, Costa Rica, at INBio, Santo Domingo de Heredia, Costa Rica and at the Nationaal Natuurhistorisch Museum, Leiden, The Netherlands.

Description of Holotype Female.—Body length 3.8 mm; forewing length 3.1 mm (Fig. 1).

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Figure 5–6. Sculpture patterns on mesosoma of *Capitonius tricolorvalvus*. Figure 5. Left lobe propodeum. Ventral view. Figure 6. Sternaulus. Lateral view.

Head: antenna with 26 flagellomeres; scapus $3.8 \times$ longer than its maximum width; first, middle and penultimate flagellomere $5.5 \times$, $2.0 \times$, $1.3 \times$ longer than wide respectively; vertex sparcely punctate and setose, area behind frontal cavity slightly convex, smooth and bare; distance between lateral ocelli to diameter of lateral ocellus $3.5 \times$, distance between lateral and median ocellus $2.5 \times$, and distance between lateral ocellus and eye $0.8 \times$; frontal cavity with strong lateral carinae reaching lateral ocelli (Fig. 3), median carina of frontal cavity protruding anteriorly (Fig. 3); temple in lateral view $0.35 \times$ eye width; eye ovoid with straight antero-ventral margin, $1.2 \times$ taller than wide; face densely punctate and setose; clypeus less densely punctate than face, medio-ventrally of clypeus a distinct tooth (Fig. 4); malar space $0.7 \times$ eye height; ventral lobe of mandible less protruding than dorsal lobe.

Mesosoma: mesosoma 1.4× longer than high; propleuron moderately punctate and setose, lateral carina foveate and complete, median carina with foveae decreasing in size posteriorly (Fig. 5); pronotum smooth to weakly punctate, dorsal margin with a row of round foveae extending ventrally at posterior margin; mesopleuron sparcely punctate with a smooth and bare median area, sternaulus with large rectangular-oval foveae which are ventrally not carinate and absent in anterior ½ of mesopleuron (Fig. 6), postpectal and epicnemial carina apparent but not distinctly foveate; mesoscutum sparcely punctate and setacous, 1.1× broader than long, notauli with large and irregular rectangular foveae, fusing medio-posteriorly on mesoscutum into a longitudinal carina (Fig. 7), lateral carina on dorsal part mesoscutum strongly protruding medio-anteriorly to each notaulus; scutellar sulcus with 2 large foveae; scutellum smooth; metapleuron and propodeum with large irregular aerolate sculpturing (Fig.

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Figure 7–8. Sculpture patterns on mesosoma of *Capitonius tricolorvalvus*. Figure 7. Notauli, in part. Dorsal view. Figure 8. Propodeum, in part. Dorsal view.

8); hind femur $3.2 \times \text{longer}$ than its maximum width; hind tibia $5.4 \times \text{longer}$ than its maximum width, hind basitarsus $5.5 \times \text{longer}$ than its maximum width; lateral spur of hind tibial $0.4 \times \text{longer}$ than basitarsus; tarsal claw with a lobe protruding distally in a tooth; inner side hind coxa with a depression parallel to anterior margin ending ventrally in ¼ of a circular area (Fig. 9), circular area in ventral view forms basal $\frac{1}{3}$ of length of ventral area (Fig. 10).

Wings: forewing; pterostigma $2.5 \times$ as long as its maximum width, vein M slightly curved, vein mcu interstitial (no Rs+Mb) second submarginal cell $0.45 \times$ length of pterostigma; hind wing vein M+CU 2.7× longer than 1M (Fig. 2); vein 1M 1.3× longer than r-m; vein 1M 1.1× longer than cu-a.

Metasoma: metasoma $2.5 \times$ longer than its maximum width; tergum 1 smooth, $1.5 \times$ longer than its apical width, dorsal carinae parallel and apparent in basal half; dorsope and laterope weakly developed; terga 2 and 3 smooth; tergum 3 medially $1.3 \times$ longer than tergum 2; ovipositor length 4.1 mm, ovipositor sheath $1.3 \times$ longer than forewing.

Color: head black, ventral half of clypeus brown, clypeal tooth black, mandible yellow-brown with dark brown apex, scapus and pedicel light yellow; antenna dull red-brown, darker towards apex; mesosoma dull red-brown; legs yellow-brown, slightly darker on apex of middle and hind tibia; tarsi yellow-white with apical 2 tarsomeres darkened; wings clear, pterostigma dark brown; metasoma dorsally black and ventrally brown, basal 3/5 of ovipositor sheath light red-brown, darker basally, remainder black with a long $(15-20 \times \text{ longer than wide})$ yellow-white apex.

Variation in Females.—Body length 3.2-4.9 mm; forewing length 2.7-3.9 mm; antenna with 23-

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Figure 9–10. Hind coxa of *Capitonius tricolorvalvus*. Figure 9. Postero-lateral view with anterior at inner side a depression. Figure 10. Ventral view with endings depression of inner sides forming circular area.

28 flagellomeres; dorsal row of foveae on pronotum apparent to weakly developed; antero-medial lobe on mesoscutum smooth to weakly rugose; notaulus and sternaulus clearly defined to weakly defined by lacking of carinae, sternaulus equally sized to decreasing in size anteriorly; scutellar sulcus with 2 or 4 (in larger specimens) foveae; pterostigma $2.3-2.7\times$ longer than its maximum width; hind wing vein M+CU $2.4-3.1\times$ length of vein 1M; vein 1M $1.0-1.2\times$ longer than cu-a and $1.1-1.4\times$ longer than r-m; dorsal carinae on tergum 1 apparent from base to midlength; ovipositor length 3.2-5.3 mm; ovipositor sheaths $1.2-1.4\times$ longer than forewing; ventral half of clypeus brown to black; hind tarsus with last 2-4 tarsomeres darkened.

Description of Males.—Similar to holotype female; body length 4.1-4.7 mm, forewing length 3.3-3.6 mm; antenna with 25–28 flagellomeres, more slender and longer then in female; first, middle and penultimate flagellomere $5.5\times$, $3.5\times$, $2\times$ longer than wide respectively; hind coxa lacking depression at inner side.

Remarks.—The key to North American and Mexican Cenocoeliini by Saffer (1982) identifies *C. tricolorvalvus* at couplet 18, which includes a group of species with clear wings, mostly red mesosoma, lack of transverse carinae on the propleuron, regularly punctate face and clypeus, and ovipositor less than $1.5 \times$ longer than forewing. However, these species are distinctly larger (forewing length >5.0)

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mm) than C. tricolorvalvus and have 29 or more flagellomeres, a red metasoma, sometimes a red head, and uniformly colored ovipositor sheaths. Capitonius tricolorvalvus can be distinguished from similarly sized and colored Costa Rican species that are undescribed by the combination of the following characters: vertex behind frontal cavity smooth and bare, lobes of propleuron lacking carina or rugose sculpturing, sternaulus not apparent on anterior $\frac{1}{3}$ of mesopleuron, hind wing vein M+CU 2.4–3.1× longer than vein 1M, tricolored ovipositor sheaths (light red-brown, black, yellow-white), and ovipositor sheaths distinctly longer than forewing length.

Taxonomy.—The generic position of C. tricolorvalvus is somewhat ambiguous. Capitonius tricolorvalvus best fits into Promachus in the generic key of van Achterberg (1994) because the hind wing vein M+CU is between 2.1× and 4.7× longer than vein 1M. The New World genus Promachus was later found to be pre-occupied by a robberfly genus, and also because intermediates between Promachus and the Old World genus Cenocoelius were found in a Costa Rican sample of Cenocoeliini, van Achterberg (1995) decided to combine both genera using the older genus name Cenocoelius. Therefore, C. tricolorvalvus fits into the redefined Cenocoelius in the generic key to the New World Cenocoeliinae by van Achterberg (1997). However, several characters of C. tricolorvalvus other than the size of hind wing vein M+CU relative to 1M do not fit into the genus description of Cenocoelius including Promachus. In C. tricolorvalvus the notauli fuse medioposteriorly, not posteriorly as in *Cenocoelius*; the sternaulus is incomplete versus complete; hind wing vein 1M is equal to slightly longer than r-m and cu-a versus shorter to sometimes equal; and the depression at the inner side of the hind coxa ends about the middle of the coxa versus distad as in several (perhaps all) formerly Promachus species. These characters do fit into the genus description of Capitonius but described species of Capitonius (van Achterberg, 1994) are larger in size than C. tricolorvalvus and have a concave vertex behind the frontal cavity. Recently, we found a morphospecies of Cenocoeliini from Costa Rica with specimens ranging in size of hind wing vein M+CU relative to 1M including both Capitonius and Cenocoelius character states sensu van Achterberg (1997). Therefore, the size of hind wing vein M+CU relative to 1M should not be used solely to distinguish between Capitonius and Cenocoelius. When the size is $2.1 \times$ or less, the wasp likely belongs to Capitonius but with a higher size up to at least $4.0 \times$ it could belong to either of the genera and other characters should be taken in consideration. Because the generic position of C. tricolorvalvus is ambiguous at present, it was decided to take a parsimonious approach and place it in Capitonius based on a majority of characters in the generic descriptions of van Achterberg (1994).

Distribution.—Capitonius tricolorvalvus occurs in Costa Rica from sea-level up to 1200 m elevation. They are most frequently encountered in tropical lowlands with moist and wet rain forest types below 500 m altitude. To date, they have not been collected in the tropical dry forest in NW Costa Rica.

Biology.—A male and a female *C. tricolorvalvus* have been reared from a stem gall of the vine *Cissus verticillata* (L.) Nicholson and C. E. Jarvis, found at Teleférico (aerial tram). The stem gall was hand collected at ground level and reared at the University of Costa Rica, San Pedro. It was probably formed by Cecidomyiidae and several cecidomyiid parasitoids were reared from it. Such stem galls are often infested by beetles (a more likely host for Cenocoeliini). No traces were found of which beetle *C. tricolorvalvus* had parasitized (P. E. Hanson, personal communication).

Two males C. tricolorvalvus were reared by the senior author from leaf petioles of Cecropia spp. at the biological field station San Ramón. Also reared from these leaf petioles were numerous Scolytidae (many species), several Curculionidae (4 spp. of zygopine weevils: Lechriops disparilis Champion, L. rufomaculatus Champion, 2 undescribed spp. of Pseudolechriops; Hespenheide, personal communication) and the leaf petioles contained a few larval Cerambycidae (probably a Lasiolepturges sp.; Hespenheide, personal communication). All adult scolytids were small (<3 mm) and, therefore, unlikely to be attacked by C. tricolorvalvus. Moreover, most scolytids emerged a few weeks earlier from the leaf petioles than the parasitoids, the zygopine weevils and the cerambycids. Most likely, based on size and weight comparisons, C. tricolorvalvus attacked the cerambycid species inside the leaf petiole of Cecropia spp.

Etymology.—The species was named for its apparent tricolored ovipositor sheaths.

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